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Enhancing Knowledge of Anxiety Disorders in Primary School Students Through Jigsaw Puzzle Activity

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ABSTRACT

The study aims to develop an Anxiety-Related Disorders Jigsaw Puzzle (ADJP) as an intervention tool and to determine its effectiveness in enhancing children's mental health literacy on anxiety-related disorders. The ADJP contained four modules defining anxiety-related disorders, symptoms, risk factors, and prevention strategies. Seven subject-matter experts and participants evaluated these modules, and feedback was used to improve the tool further. A one-group pretest-posttest quasi-experimental design was then used to test the ADJP's efficacy in enhancing knowledge of anxiety-related disorders among primary school students (N=35). The results showed significant differences in anxiety literacy (A-Lit) scores between the intervention and control groups, implying that the ADJP intervention effectively enhanced the knowledge of anxiety-related disorders among study participants. Findings suggest the tool could be used as a mental health literacy resource for classroom activities to improve students' awareness of anxiety-related disorders.

Keywords: anxiety-related disorders, mental health literacy, jigsaw puzzle

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1 INTRODUCTION

Mental health among children has been a global concern over the past year. The National Health Morbidity Survey, carried out by the Ministry of Health Malaysia in 2019, revealed that approximately 1 in 10 children between the ages of 10 and 15 were diagnosed with mental health problems (NHMS, 2020). However, it is essential to note that the actual prevalence of mental health issues might be higher due to potential under-reporting caused by limited mental health literacy (Singh et al.,2022) and inadequate data reporting (Ganaprakasam et al., 2021).

Anxiety disorder is a prevalent mental illness globally, affecting many individuals. According to Mohamad et al. (2021), anxiety is defined as a psychological condition marked by feelings of distress and heightened physiological arousal, frequently initiated by the perception of impending danger or uncertainty. The disorder encompasses cognitive aspects, including feelings of worry, anticipation of adverse outcomes, and physical symptoms such as restlessness and increased heart rate. In children, anxiety can manifest through emotions of fear, shyness, panic, and avoidance of specific situations or events that could result in significant impairment. Furthermore, this condition can persist from childhood into adulthood, increasing the likelihood of additional mental and physical health challenges for children and adolescents (Ganaprakasam & Selvaraja, 2020).

Anxiety is increasingly becoming a vital subject to study due to the higher percentage of children, particularly from developing countries, experiencing anxiety and depression (Azad et al., 2017). In Malaysia, childhood anxiety disorder is propounded as the most common and critical mental health issue (Ang, 2020; Ganaprakasam et al., 2021). A recent study on anxiety in Malaysia revealed that 54% of 224 children were screened positive for different types of anxiety, such as separation anxiety, social anxiety, and school avoidance (Ang, 2020). The mental well-being of children is an indispensable facet of societal well-being. Expanding upon the seminal groundwork laid by Ahmadi et al. (2015), which discerned an escalating prevalence of mental health concerns from 1996 to 2011, our analysis encompasses the latest findings that spotlight a prevalent mental health quandary among children. Specifically, a recent investigation uncovers that an alarming 39.7% out of 10,540 school-going children exhibit anxiety (Taufiq et al., 2022). These findings stand as prominent evidence that anxiety is visible, and there is an urgent need to develop effective strategies to enhance mental health literacy concerning anxiety-related disorders.

Mental health literacy, proposed by Jorm et al. (1997), refers to improving mental health knowledge and maximising help-seeking behaviour by reducing stigma to improve one's mental health. Past studies indicated that poor mental health literacy is often associated with delayed help-seeking behaviour and higher mental health stigma (Renwick et al., 2022; Singh et al., 2020). Meanwhile, higher mental health literacy has been reported to be a critical determinant of enhancing individuals' mental health well-being (Singh et al., 2020). Further evidence also suggests that earlier exposure to mental health literacy among primary and secondary school students can reduce the stigmas attached to mental illness, recognise risk/protective factors, and improve help-seeking behaviour (Amado-Rodríguez et al., 2022). Multiple empirical studies have examined mental health literacy among Malaysian young adolescents (Singh et al., 2018, 2020) and adults (Amirah et al., 2020; Phoa et al., 2023). A cross-sectional study involving 1707

secondary school students in Malaysia reported that only 3.0% of the students demonstrated sufficient knowledge of mental health literacy (Singh et al., 2020).

On the other hand, a lower level of mental health literacy among Malaysian adults is significantly associated with ethnicity, religion, educational level, and family income (Siti Nor Amirah et al., 2020). Factors such as ethnicity, religion, educational level, and family income appear to play a role in shaping an individual's mental health literacy. This underscores the importance of early intervention and education in mental health literacy for young people, emphasizing the need to equip them with the knowledge and skills necessary to understand and address mental health issues as they grow into adulthood.

Researchers believe that schools can be an excellent platform to nurture mental health literacy, particularly as it has regular and direct access to children, making it easier to identify those at risk of developing mental health problems (Shum et al., 2019). Additionally, schools can provide a supportive and nurturing environment for children that promotes positive mental health practices and reduces the stigma associated with seeking help for mental health issues. The Ministry of Education Malaysia has made a concerted effort to address mental health concerns among upper primary students. This includes introducing mental health online screening and implementing targeted intervention programs (Malaysia Ministry of Education, 2023). Given the severe consequences of anxiety on students' academic performance and social functioning (Khesht-Masjedi et al., 2019), there exists a prominent need for more efforts to enhance mental health literacy (Singh et al., 2022) as a foundation for mental health prevention, stigma reduction, and enhanced help-seeking behaviour among young children (Amado-Rodríguez et al., 2022; Simkiss et al., 2020).

The Diagnostic and Statistical Manual for Mental Disorders (DSM-5-TR) has identified several anxiety disorders that can develop during childhood or adolescence, which include separation anxiety disorder, generalised anxiety disorder, and social anxiety disorder (Boelen, 2021). Following the severe consequences of anxiety disorders and their high prevalence rates and persistent nature, it is vital to enhance children's knowledge of them. Past research suggests that fun-based activities such as jigsaw puzzles can effectively (Fissler et al., 2018) reduce anxiety among hospitalised individuals (Dewi et al., 2020). However, empirical evidence concerning using jigsaw puzzles to deliver mental health literacy among school students is still in its infancy (Selamat et al., 2021; Tuijnman et al., 2019).

Since mental health literacy is viewed as a global public health concern (Renwick et al., 2022) and stands as a prominent contributing factor toward developing help-seeking behaviour (Brooks et al., 2021), the current study aims to develop Anxiety-Related Disorders Jigsaw Puzzle (ADJP). and assesses its effectiveness toward enhancing the knowledge on anxiety-related disorders among primary school students. The objectives of this study are as follows:

1. To assess the validity and reliability of Anxiety-Related Disorders Jigsaw Puzzle (ADJP).

2. To examine the effectiveness of Anxiety-Related Disorders Jigsaw Puzzle (ADJP) intervention in improving primary school students' anxiety literacy by comparing their Anxiety Literacy Questionnaire scores before and after the intervention.

2 METHODOLOGY

This study comprised two phases: Phase One focused on developing the ADJP and testing its reliability and validity; Phase Two assessed the efficacy of the ADJP intervention in enhancing anxiety literacy among elementary school students.

PHASE 1

2.1 Research Design

The development of the ADJP module took into account Sidek's Module Development Model (SMDM) process, as outlined by Noah and Ahmad in 2005. This module is designed for use by school counsellors and educators. In the study's first phase, a cross-sectional design was employed to collect data on the ADJP's reliability and validity.

2.2 Participants

In this phase, participants were chosen from a primary school in Kulim, Kedah, based on specific inclusion criteria. These criteria included being primary school students aged 11 to 12 years old, possessing adequate reading and writing skills, and being able to complete the questionnaire effectively. A total of 15 participants meeting these criteria were selected, along with the involvement of seven subject-matter experts, forming a foundational cohort for the initial development phase of the ADJP.

2.3 The Development and Content of ADJP

The initiative of developing the ADJP intervention was based on a previous study by Ganaprakasam et al. (2020) that reported a higher prevalence of anxiety symptoms (Generalized Anxiety Disorder, Social Anxiety Disorder, and Separation Anxiety Disorder) among primary school students. The development of the ADJP puzzles took approximately four months, from May to August 2022. Researchers have chosen jigsaw puzzles to enhance mental health literacy because of their engaging and enjoyable nature, hands-on learning benefits, and promotion of visual-spatial skills (Fissler et al., 2017).

The set of jigsaw puzzles focused on the definition of three types of anxiety (Generalised Anxiety Disorder, GAD; Social Anxiety Disorder, SAD; and Separation Anxiety Disorder, S-AD) as well as the symptoms, risk factors, and prevention strategies and treatment options with detailed information presented in Table 1 and Figures 1 through 4.

The initial version of the intervention was titled the Anxiety-Related Disorders Jigsaw Puzzle (ADJP). Anxiety symptoms and signs were essential for individuals to comprehend the earlier problem and navigate the prevention and treatment phase. Engaging children in play-based activities is essential for enhancing their understanding of anxiety and aiding their ability to internalise and address problems promptly. Doing so can minimise the potential negative impact on their functioning and overall development.the prevention and treatment phase.

Table 1. Content of the ADJP module.

Anxiety-Related Disorders Jigsaw Puzzle (ADJP)	**Content**
Module 1: Definition of Anxiety	Generalised Anxiety Disorder is a mental health condition characterized by these specific symptoms: ● Ongoing/excessive worry ● Increased heart rate ● Nervous/irritable ● Feeling weak or tired ● Difficulty concentrating ● Hyperventilating Social Anxiety Disorder: ● Intense anxiety or fear of being judged, negatively evaluated, or rejected in a social or performance situation. Separation Anxiety Disorder: ● A continuation of intense feelings of anxiety associated with being separated from their parents *(Source: National Institute of Mental Health, 2018)*
Module 2: Symptoms	Generalised Anxiety Disorder ● Excessive anxiety and worry ● Increased muscle aches or soreness ● Impaired concentration ● Irritability ● Difficulty sleeping ● Restlessness Separation Anxiety Disorder ● Separation related stress ● Excessive worry about losing attachment figure

- Upset stomach
- Reluctance to go places
- Fear of being alone
- Nightmare about separation

(Source: Azham et al., 2021; Ang, 2020)

Social Anxiety Disorder

- Uncomfortable speaking to adults
- Blushes/trembles around other individuals
- Withdrawn from social activities/wants to stay home
- Throw tantrums when confronted with new people
- Avoid eye contact, mumble, or speak quietly when addressed by other people
- Complain of stomach aches and want to stay away from school

(Source: National Institute of Mental Health, 2018)

Module 3:
Risk Factors

Generalised Anxiety Disorder

- Genetic predisposition
- Brain chemistry
- Family background
- Social influence
- Lifestyle factors

(Source: National Institute of Mental Health, 2018)

Social Anxiety Disorder

- Early traumatic event
- Parenting style
- Isolated upbringing
- Brain structure
- Observing with others SAD
- Genetics
- Societal expectation

(Source: Cruz et al.,2017; Brook & Schmidt, 2008)

Separation Anxiety Disorder

- Environment
- Parenting style
- Temperament
- Genetics

(Source: Lewinsohn et al., 2008)

Module 4: Prevention Strategies / Treatment (Baughman et al., 2020)	Prevention strategies ● Exercising ● Painting ● Eating favourite foods ● Meditation ● Journaling *(Source: Scaini et al., 2022; Fisak et al., 2019; Crescentini et al., 2016; Larun et al., 2006)* Treatment options ● Talk therapy ● Cognitive Behavioural Therapy (CBT) ● Exposure therapy ● Medications *(Source: Borza et al., 2017; McGuire et al., 2014)*

Figure 1. Definition of anxiety-related disorders.

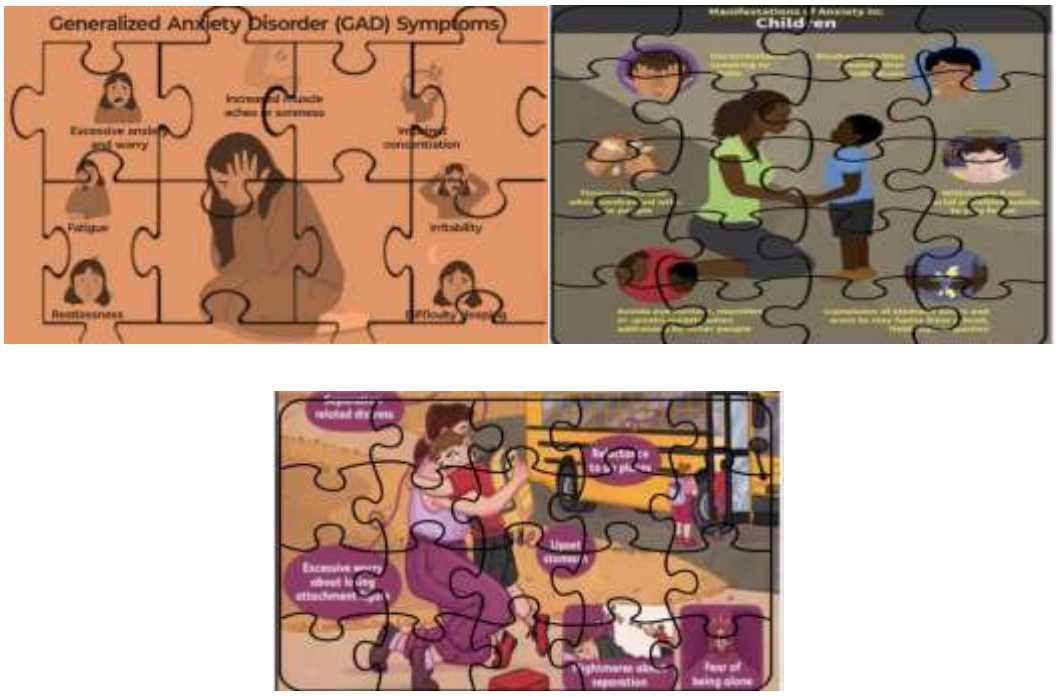

Figure 2. Symptoms of anxiety-related disorders.

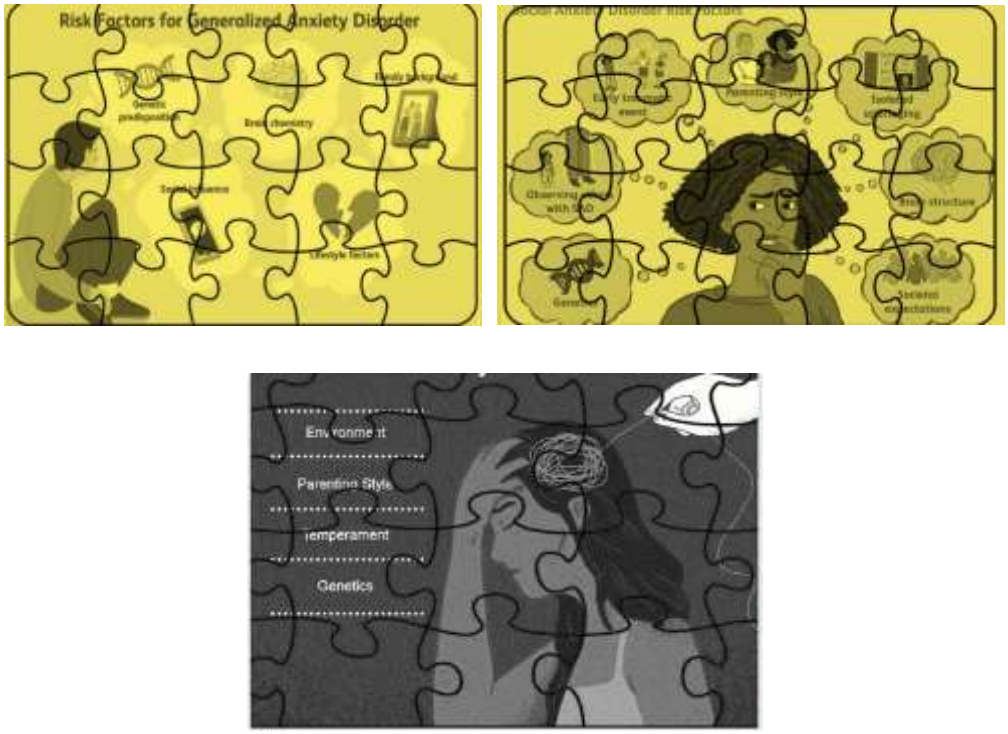

Figure 3. Risk factors of anxiety-related disorders.

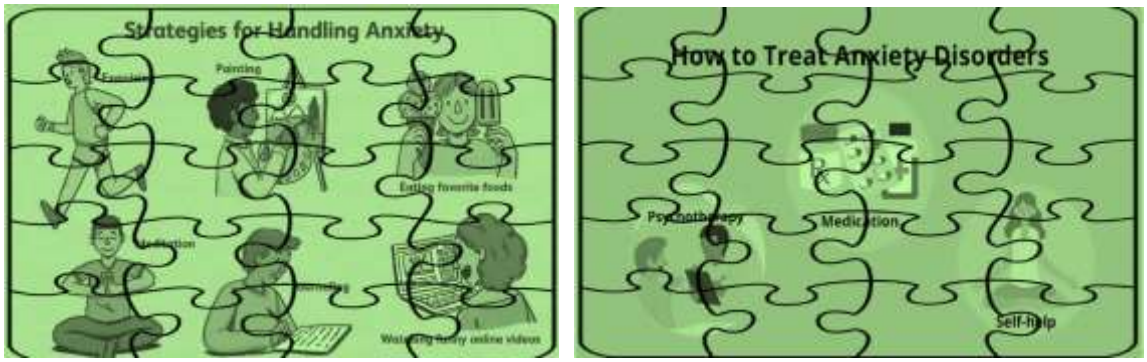

Figure 4. Prevention strategies / Treatment options for anxiety-related disorders.

2.4 The Content Validation Process of ADJP

The process of selecting experts and obtaining their feedback on the content validity of the ADJP module was conducted with careful consideration of their expertise, and qualifications. Seven appointed experts were selected to evaluate the validity of the module's contents. These experts possessed the expertise and experience to evaluate the suitability of the module, with the following selection criteria: (i) Possess the expertise and knowledge related to the field of psychological counseling, and (ii) Practitioners in the field of psychology and counseling. The purpose of this validation was to assess whether the module's content could effectively be tested based on the intended constructs or aspects it aimed to measure (Goodwin, 2007).

To assess the content validity of the ADJP module, the draft version of the module was evaluated along with a questionnaire developed by Russell (1974). Russell proposed five components to gauge module validity: (a) suitability of the module for the target population, (b) satisfactory implementation environment for the module, (c) sufficient time allocation for completing the module, (d) potential for the module to enhance students' academic performance, and (e) ability of the module to positively influence students' attitudes. The questionnaire consisted of five items utilizing a five-point Likert Scale ranging from 1 (strongly disagree) to 5 (strongly agree).

The content validity of the ADJP module was calculated based on the formula developed by Russell (1974) in Figure 5. A module can be considered to have high content validity if the validity result exceeds 70% (Tuckman & Waheed, 1981). The total score given by each expert (X) is divided by the total maximum score of the Likert scale (25) and then multiplied by 100 per cent. In obtaining the achievement of content validity in decimal figure, the researcher should change it to decimal figure with 100 per cent as 1.00 and 0 per cent as .00 which resembling the correlation coefficient value (Noah & Ahmad, 2005).

$$\frac{\text{Total score by evaluator (X)}}{\text{Maximum score (25)}} \times 100\% = \text{Content validity of achievement}$$

Figure 5. The formula to determine the content validity of the ADJP module

PHASE 2

2.5 Research Design

In Phase Two of the study, a quasi-experimental design, specifically a one-group pretest and posttest approach, was adopted to evaluate the effectiveness of the Anxiety-Disorder Jigsaw Puzzle (ADJP) intervention by comparing scores from the Anxiety Literacy Questionnaire (A-Lit). This research design is commonly employed in behavioral studies to assess the impact of interventions on the target group's outcomes (Cranmer, 2017; Krass, 2016). The one-group pretest and posttest quasi-experimental design encompasses three key components (Ary et al., 2006): firstly, the

administration of a pretest to measure the dependent variable (Anxiety Literacy); secondly, the implementation of the ADJP module within the experimental group; and finally, the administration of a post-test to determine the effectiveness of the ADJP in enhancing participants' anxiety literacy levels. Notably, this intervention was conducted by the researchers who underwent comprehensive training in mental health education to ensure its appropriateness and effectiveness.

2.6 Participants

In this phase, participant selection was carried out using a purposive sampling technique, carefully targeting individuals who met specific inclusion criteria. The criteria aimed to ensure a representative yet focused participant group. A crucial criterion was the absence of any history related to anxiety disorders or other mental health conditions among the selected participants.

The population comprised primary school students exclusively from Year 5 and Year 6 at Sekolah Kebangsaan Taman Selasih, located in Kulim, Kedah. From this population, a sample of 35 students was randomly selected for participation. The decision to employ this sample size was carefully guided by the sample size determination formula introduced by Cohen (1992), Russell (1974), and Fraenkel and Wallen (1996), which collectively affirms its appropriateness and adequacy. Furthermore, it is noteworthy that scholars such as Sidek Mohd Noh (2002) and Tuckman (1978) concur that a modest sample size is particularly fitting in cases where the research centers on the evaluation of behavioral aspects. This strategic approach to sample size selection, along with the consensus among scholars, contributes to the robustness of the study's methodology and its ability to effectively address the research objectives

2.7 Instrument

The Anxiety Literacy Questionnaire (A-Lit) (Gulliver et al., 2012) comprised 22 items measuring mental health literacy, particularly anxiety. Each item had three possible choices (True, False, or I don't know). The participants scored 1 point for each correct answer, with higher total scores indicating higher literacy for anxiety. The A-Lit questionnaire was reported to have adequate validity and excellent test–retest reliability (Gulliver et al., 2012).excellent test–retest reliability (Gulliver et al., 2012).

2.8 Procedure

The participants in the intervention group attended several sessions conducted by the researchers (see Table 2). The first session was dedicated to explaining the objective of the intervention, the pretest assessment using the A-Lit questionnaire, and discussing the definitions of anxiety-related disorders by focusing on GAD, SAD, and S-AD. The second session focused on understanding the anxiety symptoms, followed by the third session, which highlighted the risk factors and the final session, which discussed several prevention and intervention strategies to overcome anxiety among children and a post-test assessment.

All participants in the intervention group completed the ADJP individually in every session, during which the researchers encouraged them to discuss the different elements of the puzzle and what they represented concerning anxiety-related disorders.

Table 2. Contents of the sessions.

Sessions	Contents
Session 1	Introduction to anxiety disorders • Explain the objective of the intervention. • Administer pretest assessment. • Definition and explanation of anxiety-related disorders (GAD, SAD, and S-AD). • Discussion of common anxiety-related disorders in children.
Session 2	Understanding the symptoms of anxiety • Identify symptoms of GAD, SAD, and S-AD in children.
Session 3	Understanding the risk factors of anxiety • Discuss the risk factors of anxiety (GAD, SAD, S-AD) in children.
Session 4	Understanding the prevention and intervention strategies • Discuss several prevention and intervention strategies to overcome anxiety among children. • The importance of self-care and healthy habits. • Review of the jigsaw puzzle-based activity and what is learned. • Administer posttest assessment.

2.9 Addressing Research Ethics in the Experimental Study

In our experimental study conducted at Sekolah Kebangsaan Taman Selasih, we placed the utmost importance on addressing research ethics to ensure the well-being and rights of the participants. To this end, informed consent was obtained from parents or legal guardians, providing them with a comprehensive explanation of the study's purpose and procedures. Additionally, prior permission from the school principal was obtained to conduct the research on the premises. Throughout the study, strict measures were in place to maintain confidentiality and anonymity. Data handling and retention protocols were diligently followed. Our commitment to upholding ethical standards underscores our dedication to responsible research practices and the protection of our participants.

2.10 Data Analysis

Descriptive statistics analysis was conducted to measure the mean, standard deviation, and frequencies of the participant's age and gender. Each item was tested for content validation index (CVI) and face validation index (FVI). The scale-level content validity index (S-CVI) was estimated manually. In contrast, the face validity was analysed descriptively, and all comments from the experts were listed accordingly to review and evaluate the effectiveness of the puzzles. A paired-sample t-test was used to compare the mean scores of the intervention group on two different occasions (pretest and posttest) to determine whether there was a significant difference between the two means. This test assumed that the data were normally distributed and that the differences between the pretest and posttest scores were normally distributed and independent. All statistical analyses were conducted using the SPSS version 19 software.

3 FINDINGS

This section summarizes the findings from Phase One and Phase Two of the study.

PHASE 1

3.1 Content Validity Index (CVI)

Table 3. Content validity analysis of the ADJP module.

	Validity Components	%	Coefficient	Experts' Response
1	The ADJP module's content meets its population target (primary school students aged 10 to 12)10 to 12)	98	.98	Accepted
2	The ADJP module's content could be successfully implemented among primary school students aged 10 to 12)10 to 12)	96	.96	Accepted
3	The ADJP module's content is compatible with the time allotted.	100	1.0	Accepted
4	The ADJP module's content may help students to reason.s content may help students to reason.	100	1.0	Accepted
5	The ADJP module's content may help students to enhance their knowledge of anxiety.	96	.96	Accepted
	Content validity coefficient of the ADJP module	92	.92	Accepted

Table 3 shows the ADJP module's content validity results based on the experts' evaluation and assessment. It can be seen that the validity testing of the ADJP module indicates a high coefficient of content validity at .92. Whereas, the coefficient of content validity based on each component of validity ranges between .96 and 1.0

3.2 Face Validity Index (FVI)

Table 4 shows the socio-demographic characteristics of the participants in the face validation process, which comprise two variables: gender and age. It includes information on the number of participants, the respective percentages within each variable category, as well as the mean and standard deviation values where applicable.

Table 4. Socio-demographic characteristics of the participants in the face validation process.

Variable	n	(%)	Mean	Std. Deviation
Gender				
Male	7	46.6		
Female	8	53.4		
			12.0	0.63
Age				
12 years old	12	80		
11 years old	3	20		
			1.53	0.50

Table 5. Face validity of the jigsaw puzzles.

Validity	Respondents	Comments
Face validity	15 respondents	● Brief/straight to the point/informative and colourful. ● Plain English, easily understandable. ● The puzzle taught us much information concerning the types of anxiety. ● Very important information about prevention. ● Beneficial to all levels of students, including teachers.

Table 5 shows the face validity comments provided by the participants. The finding indicates that the ADJP is informative and provides essential information regarding the common types of anxiety affecting children. This puzzle is also known as a time saver because the pieces were big, and every puzzle set had its colour, allowing the participants to solve it quickly.

3.3 ADJP Module Reliability

Table 6 displays the findings of reliability testing conducted on four distinct modules within the ADJP (Anxiety Definition, Symptoms, Risk Factors, and Prevention Strategies/Treatment) module. The reliability test employed Cronbach's alpha as a measure, revealing a notably high reliability coefficient for the overall ADJP module at .92. Each individual module demonstrated good reliability scores, as follows: Module 1 (Definition of Anxiety) exhibited a reliability coefficient of 0.78, Module 2 (Symptoms) achieved a reliability coefficient of 0.81, Module 3 (Risk Factors) obtained a reliability coefficient of 0.84, and Module 4 (Prevention Strategies/Treatment) recorded a reliability coefficient of 0.85 (see Table 6).

Table 6. Reliability testing results for four modules in the ADJP module.

Submodule of ADJP	Reliability coefficient
Module 1: Definition	.78
Module 2: Symptoms	.81
Module 3: Risk factors	.84
Module 4: Prevention Strategies/Treatment	.85
Reliability coefficient of ADJP module	.92

PHASE 2

Table 7. Analysis of differences in Anxiety Literacy (A-Lit) scores during pre-and post-test assessments.

Intervention	N	Mean Score	Standard Deviation (SD)	t-value	df	p-value
Literacy on Anxiety	35					
Pretest		19.7	3.4	13.8		
Posttest		29.2	4.5		34	<.001

Table 7 presents an analysis comparing Anxiety Literacy (A-Lit) scores before and after the pretest and post-test assessments. Most participants were male (53%), followed by female (43%). The mean scores of the Anxiety Literacy (A-Lit) during the pretest and posttest were 19.7 (SD=3.4) and 29.2 (SD=4.5), respectively. This indicates a significant improvement in anxiety literacy following the ADJP intervention ($t(34)=13.8$, $p<.001$). These results support the use of ADJP as an intervention to promote mental health literacy among primary school students.

4 DISCUSSION

The purpose of this study was twofold: firstly, to develop the Anxiety-Related Disorders Jigsaw Puzzle (ADJP) as an intervention tool, and secondly, to assess its effectiveness in enhancing

children's mental health literacy regarding anxiety-related disorders. The findings indicate that ADJP has good content validity and can be used among primary school students. Furthermore, the experts believed that ADJP could increase children's level of knowledge regarding anxiety-related disorders along with the symptoms, risk factors, prevention strategies, and available treatment options. It also received positive comments from the panel of experts, such as using plain English and brief and informative points according to the students' level of thinking. According to the experts' evaluations, the ADJP was deemed suitable for the target population of primary school students aged 11 to 12 years old. They also expressed that the module could be effectively implemented within the designated time frame.

Furthermore, the ADJP facilitates students' reasoning abilities and significantly enhances their knowledge of anxiety-related topics. Based on expert assessments, the ADJP was found to be well-suited for the targeted population of 11 to 12-year-old primary school students. Experts highlighted its appropriateness, including the use of plain language and concise, age-appropriate content. They also expressed that the module could be effectively implemented within the designated time frame. In summary, the development guide for the ADJP, which was derived from the Sidek Developmental Module (Noah & Ahmad, 2005), played a significant role in achieving good content validity by considering the module's validity conditions as outlined by Russell (1974).

The ADJP module demonstrated a good level of content validity and an acceptable reliability coefficient. These findings align with previous studies conducted by Len et al. (2020), Aga Mohd Jaladin et al.,(2023) and Mahfar et al. (2019). These prior studies also reported achieving acceptable levels of validity and reliability when employing SMDM (Sidek's Module Development Model) procedures. Consequently, the SMDM methodology has proven to be valuable for developing modules.

Further analysis of the pre-and post-test scores on anxiety literacy indicated significant differences in A-Lit scores for the intervention group. It suggests that the ADJP module effectively enhanced primary school students' knowledge of anxiety-related disorders. The findings of this study support previous research highlighting the significance of puzzle-based activities in enhancing mental health literacy (Selamat et al., 2021; Brooks et al., 2021). From a cognitive psychological perspective, these outcomes likely stem from cognitive engagement and active learning principles. Puzzle activities, like those incorporated into the ADJP, necessitate focused attention, problem-solving, and manipulating visual and spatial information (Fissler et al., 2018). Such cognitive processes trigger the engagement of various brain regions, enhancing neural connections related to memory and understanding (Yu et al., 2022). In the context of anxiety literacy, the interactive and visual nature of the ADJP likely facilitated the encoding of information related to anxiety-related disorders. Moreover, repeated exposure to these concepts through puzzle-solving could reinforce memory retention and understanding (Fissler et al., 2018).

Our current research marks the pioneering effort to assess the efficacy of employing jigsaw puzzles as a means to bolster anxiety literacy among primary school students in Malaysia. Historically, puzzle-based interventions have predominantly concentrated on augmenting mental health knowledge among adolescents (Gimba et al., 2020; Selamat et al., 2021). Remarkably, to date, no interventions of this nature have been expressly customized for the primary school student

demographic in Malaysia. In light of this, the current research aims to address this gap by developing an age-appropriate puzzle intervention targeted at primary school students, with the ultimate goal of improving their mental health awareness and management skills.

Furthermore, the flexibility of the ADJP module, which can be used by school guidance and counseling teachers during school hours without the necessity of internet access, holds paramount importance. This feature is particularly vital when considering the development of modules to enhance mental health literacy, especially in middle-income countries like Malaysia. Notably, many schools in rural Malaysia encounter difficulties associated with limited internet connectivity, as highlighted by Jafar et al. (2022).

5 IMPLICATIONS

Mental health issues among children often remain unnoticed (Renwick et al., 2022). Therefore, numerous interventions and efforts should be optimised in the school setting to instil mental health literacy among children. Mental health literacy is vital for preventing mental health disorders among children and enhancing psychosocial support and awareness. This work, hence, carries an essential implication toward resolving the lack of game-based activities and resources to improve mental health literacy among children.

The development of the ADJP module is anticipated to yield a range of positive impacts on children's well-being. It aims to reduce the stigma surrounding mental health issues by normalising conversations and fostering empathy. Furthermore, the module equips children with the knowledge and skills to recognise early signs of mental health challenges, enabling timely intervention and support. It also provides valuable coping strategies, helping children manage stress and emotional difficulties better. Moreover, the ADJP module educates children on how and where to seek help, promoting proactive help-seeking behaviour. A cohesive approach fosters a more understanding, emotionally resilient, well-equipped generation of children, ultimately enhancing their overall well-being.

School guidance and counselling teachers play a significant role in supporting the socio-emotional well-being of students (Alexander et al., 2022). Therefore, the current study's findings will allow school counsellors to implement evidence-based prevention and intervention strategies. This will assist them in addressing the complex challenges students face and ultimately enhance their overall success. ADJP can also benefit school counsellors, psychologists, and teachers by being a mental health resource for classroom activity. Practising the evidence-based prevention and intervention module will not only deliver a positive impact and highly desired outcomes among school students but also instil an evidence-based mindset among guidance and counselling teachers. In conclusion, the findings imply that the application of ADJP will aid primary school students in comprehending the definition, symptoms, risk factors, prevention strategies, and available treatment options for anxiety-related disorders.

6 CONCLUSION

Evidence from this study suggests that ADJP is a simple yet effective module for enhancing mental health literacy related to anxiety disorders among primary school students. Our findings further demonstrate that early efforts to nurture the knowledge of anxiety disorders will enhance the help-seeking behaviour of primary school students by reducing the stigma associated with mental health disorders. However, this study has several limitations. Given the specific nature of the problem under investigation, we must exercise caution when generalising our results. This caution is critical considering that the participants in our study were predominantly of Malay ethnicity. Malaysia is a culturally diverse country with a multi-ethnic population, including Malays, Chinese, Indians, and indigenous groups. Developing a module that is culturally responsive ensures that it addresses the unique cultural factors that may influence how anxiety disorders are perceived, experienced, and managed within different communities. Therefore, further research is thus needed involving students of other ethnicities (e.g., Chinese, Indian, or indigenous ethnicity) to develop a culturally responsive ADJP module to enhance Malaysian students' knowledge of anxiety disorders.

Furthermore, it is crucial to enhance mental health literacy among special needs children, as this intervention can play a pivotal role in promoting their comprehension of mental health concepts. Additionally, future studies should concentrate on developing an activity-based jigsaw puzzle module that focuses on other mental health disorders. This contribution will further support the ongoing efforts to promote psychological well-being and enhance mental health literacy among primary school students.

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